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VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary  
Office of the Secretary  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Re: WT Docket No. 06-150; CC Docket No. 94-102; WT Docket No.  
01-309; WT Docket No. 03-264; WT Docket No. 06-169; PS  
Docket No. 06-229; WT Docket No. 96-86

Dear Secretary Dortch:

On behalf of L-3 Communications Corporation ("L-3"), please find attached comments filed in response to the April 27, 2007 Further Notice of Proposed Rulemaking in the above-captioned proceeding. L-3 is a leading supplier of a broad range of products and services used in a substantial number of aerospace and defense platforms. It is also a major supplier of systems, subsystems and products on many platforms, including those for secure networked communications and communication products, mobile satellite communications and information security systems. L-3 has not previously filed comments in this proceeding.

As explained in the comments, L-3 opposes the Commission's tentative conclusion to prohibit wideband operations in the 700 MHz band allocated to public safety. Abandoning wideband in favor of broadband would undermine public safety by reducing flexibility and increasing costs. L-3 is also concerned about the "Frontline" proposal to license a commercial entity which would control a nationwide public safety network. The Commission does not appear to have the statutory authority to grant public safety spectrum for commercial use as contemplated by the proposal. The proposal's mixing of commercial and public safety goals present untenable conflicts of interest.

Kindly refer any questions in connection with this letter or the enclosed comments to the undersigned.

Very truly yours,

Thomas McCann Mullooly

Attachment

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**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, DC 20554**

In the Matter of	)	
	)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands	)	WT Docket No. 06-150
	)	
	)	
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems	)	CC Docket No. 94-102
	)	
	)	
Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones	)	WT Docket No. 01-309
	)	
	)	
Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27 and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services	)	WT Docket No. 03-264
	)	
	)	
Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules	)	WT Docket No. 06-169
	)	
	)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band	)	PS Docket No. 06-229
	)	
	)	
Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010	)	WT Docket No. 96-86
	)	

**COMMENTS OF L-3 COMMUNICATIONS CORPORATION**

**Introduction and Summary**

L-3 Communications Corporation (“L-3”) submits these comments in response to the Report and Order and Further Notice of Proposed Rulemaking issued by the Federal Communications Commission (“FCC” or “Commission”) in the above-captioned proceedings on April 27, 2007 (“FNPRM”).

L-3 is a leading supplier of a broad range of products and services used in a substantial number of aerospace and defense platforms. L-3 is a major supplier of systems, subsystems and products on many platforms, including those for secure networked communications and communication products, mobile satellite communications, information security systems, shipboard communications, naval power systems, missiles and munitions, telemetry and instrumentation and airport security systems. L-3 also is a prime system contractor for aircraft modernization and operations and maintenance, Command, Control & Communications (“C3”), Intelligence, Surveillance and Reconnaissance collection systems and services, training and simulation, intelligence services and government support services. Its customers include the United States Department of Defense and its prime contractors, the United States Department of Homeland Security, the United States government intelligence agencies, major aerospace and defense contractors, allied foreign government ministries of defense, commercial customers and certain other federal, state and local government agencies.

L-3 has not previously filed comments on this proceeding. However, based on its experience meeting the needs of its diverse public safety customer base, L-3 believes that certain actions being considered by the Commission could seriously undermine any hope of an optimal, efficient use of spectrum to serve public safety needs. These comments focus on two specific issues.

First, as to spectrum in 700 MHz band allocated to public safety, the Commission has put forth a seriously flawed tentative conclusion “to redesignate the wideband spectrum to broadband use . . . and to prohibit wideband operations on a going forward basis.” *FNPRM*, at PP 11, 250. Second, L-3 perceives serious public safety drawbacks with the risky proposal put

forth by Frontline Wireless, LLC to establish a commercial licensee that would build a broadband infrastructure for both commercial and public safety use.

### **Analysis**

#### **I. Prohibiting Wideband in Favor of Broadband Would Undermine Public Safety**

The FNPRM seeks comment on the tentative conclusion “that providing broadband spectrum for advanced public safety communications would best serve our goal of enabling first responders to protect safety of life, health and property.” *FNPRM*, at P 253. The FNPRM tentatively concludes that “flexibility to deploy either wideband or broadband applications . . . could hinder efforts to deploy a nationwide, interoperable broadband network by perpetuating a balkanization of public safety spectrum licenses, networks and technology deployment.” *Id.* These tentative conclusions ignore the coverage limitations of broadband, specific problems with broadband for public safety use, and the significant benefits provided by wideband. They are also mistaken as to the best way to respond to the challenge of achieving interoperability nationwide. L-3 is concerned that the cachet behind broadband, and the assumptions regarding its supposed superiority, are masking the efficiencies and flexibility provided by wideband.

##### **A. Benefits of Wideband Outweigh Benefits of Broadband**

The Commission does not appear to recognize that the vast majority of data needs, and in fact all mission-critical public safety needs, can be addressed by wideband capability. There are only a select few applications, such as high-definition video transfer, which actually require broadband rather than wideband. The true mission critical capabilities for public safety agencies are (i) voice and (ii) a level of data transmission that is far below that required for high definition video transfer. Wideband can provide both. With readily available software, wideband provides acceptable data streams for video streaming. There is a significant

operational trade-off between the provision of a true mission critical capability for voice and data at wideband rates in contrast to non-mission critical data at broadband rates. The desire to provide a “third pipe” for broadband to private and commercial users should not blind the Commission to the significant additional cost, additional vulnerability, and decreased robustness for public safety goals that would be part of the price of abandoning wideband.

Supporters of the Commission’s tentative conclusion to elevate broadband over wideband for public safety functions point to the eventual benefits of voice and data integration. Although the basic concept of convergence of voice and data services is a logical and cost effective evolutionary outcome, the proposed implementation would result in critical services being transported over a non-mission critical data network. This would be a severe mistake, significantly reducing the mission critical capabilities currently relied on by the public safety community. Rather, if convergence occurs on a mission critical transport layer for both voice and data, such as systems currently in development for use with the 700 MHz wideband spectrum set aside for public safety, then the performance outcome will significantly enhance the operational scenario for the public safety defender.

Further, conversion of the currently licensable 700 MHz wideband segments into spectrum for broadband “only” usage will deprive the public safety community of operational benefits that may be provided by mission critical data systems currently in advanced stages of development. These stranded costs should not be ignored.

## **B. General Coverage Limitations of Broadband**

Broadband technology clearly has limits. The cost of providing nationwide seamless broadband coverage is likely prohibitive. Broadband is not likely to be capable of meeting basic goals such as covering rural and urban areas with 97% coverage and 99.999% availability and providing the means to maintain communication during network outage.

In rural areas, broadband technology (including CDMA EVDO REV A, UMTS-WCDMA, and WiMax) is largely unsuitable. Broadband technology is generally designed for dense deployments of small, high-capacity cells and thus cannot economically provide the required coverage in rural areas. For reference, WiMax is probably the best performer generally at 1 to 2 km in Non Line-of-Sight (“Non LOS”), 3 to 13 km in Near LOS – a very limited range. In practice this will likely mean no public safety coverage in low-density rural areas. No nationwide licensee is going to build out expensive radio base stations and backhaul infrastructure without any clear way of recovering such costs, which would be very prohibitive to users. In contrast, wideband technology such as TIA-902 does not suffer this problem. Specifically, an open standards based wideband data system such as that defined by TIA-902 – designed to meet public safety specific requirements – is a better solution from a technical and economic perspective than a broadband-based modified commercial approach. Comparing characteristics for broadband (~1.25 MHz, 3.75 MHz, 5 MHz) and wideband (~150 kHz) systems, based upon published data for the broadband systems, and a TIA-902 solution, a typical broadband RF system has a coverage area of 1-2 km (radius) in Non LOS, 3-13 km (radius) in Near LOS and a typical wideband RF system has a coverage area of 5-10 km (radius) in Non LOS, 17-50 km (radius) in Near LOS. Assuming the United States has 9,9629,091 km<sup>2</sup> of land surface area, a nationwide broadband solution would require 15-25 times more towers than a wideband solution. A wideband solution would have to cost 15-25 times more for the broadband solution to break even. Quite generally, a wideband system, such as TIA-902, offers higher multi-cell spectral efficiency than is obtainable from EVDO, WCDMA or from WiMax, as well as the flexibility to support multiple independent user agencies within a given geographic area (thanks to more available channels in the limited spectrum). Yet today’s wideband solutions are

not as expensive as current broadband solutions. Moreover, all the additional cost of the broadband approach would not provide a commensurate additional benefit.

### **C. Specific Public Safety Limitations of Broadband**

The tentative conclusion to favor broadband over wideband is driven, in part, by a mistaken perception that a broadband communications channel in of itself is sufficient to satisfy the operational needs of public safety agencies. The Commission appears to have ignored the substantial investment and effort by the Department of Homeland Security's SAFECOM program and the National Public Safety Telecommunications Council toward the assessment of public safety critical needs and recommendations towards their realization. Specifically, in reference to broadband cellular type solutions, the investigations conducted outline significant deficiencies of these implementations in the following areas:

- General performance and mission critical operational services
- System physical and electronic security
- Adaptability to address needs of a varied and diverse agency community
- Network resilience and reliability
- Centralized management and control

Broadband is also unable to handle communication surges during public safety incidents, as well as communications needs outside the range and/or in the absence of communications infrastructure (no "direct" infrastructureless mode of operation). The need for radio capacity increases during major incidents and accidents. That capacity must be guaranteed to the rescue and law enforcement forces. Wideband's group calls and direct mode communications, unlike any proposed broadband technology, provide robust incident/surge capabilities. To the extent that a communications system is negatively affected in a catastrophic situation, such as a hurricane, wideband systems can be more quickly repaired and put back to

use over a given coverage area than broadband, which as described above must rely on a larger number of tower installations.

The Commission should consider international experience in failed attempts to use commercial networks for public safety functions. L-3 understands from its international contacts that the most advanced countries in the world have entrusted or are planning to entrust the communication system of first responders to advanced digital technologies specifically designed for public safety organizations. These countries have experienced that the commercial networks, often used to integrate or to supplement old radio systems, give no warranty of availability during major accidents and do not have the needed traffic capacity to support the peak communications necessary during exceptional conditions. Further, Germany and European countries have found that current commercial systems do not appear to adequately support a number of crucial functions for a public safety system.<sup>1</sup>

Similarly, limiting the public safety infrastructure to one technology is not conducive to providing the coverage and operational requirements in the times of emergency. Providing flexibility also diminishes the likelihood of a single point failure that would affect the entire network.

Further, broadband is not an efficient use of spectrum when it comes to national public safety needs. The frequency spectrum reallocation proposed by the FNPRM diminishes the number of channels available and forces channel reuse that will conflict with coverage capabilities when attempting to meet data throughput requirements under emergency conditions.

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<sup>1</sup> Such functions include: group calls, closed user groups, high priority calls, pre-emptive speech service, base station fallback mode, rapid call establishment time less than 0.5 seconds, dynamic management of talkgroups, emergency calls, prioritization of communications, incident capacity, full rural coverage under normal conditions, guaranteed coverage under exceptional conditions, infrastructureless direct mode communications, air to ground or ground to air dedicated frequencies and PoC talkgroup functions.



Public safety organizations require access to their radio resources during critical times through networks that are immediate (able to provide fast call set-up), secure (enabling users authentication in the network and communications encryption) and reliable (redundant and fault tolerant). The previous and current frequency allocations for public safety use are not adequate for a nationwide, interoperable system at this time. Wideband, as currently broken up into a greater number of channels, would facilitate a broader geographic coverage while minimizing the need for spectrum resting fallow in channels unused for avoidance of interference.

#### **D. Misguided Conclusions About Interoperability**

Another driving factor behind the Commission's tentative conclusion to abandon wideband is a misperception regarding the goal of interoperability. The Commission mistakenly suggests that a single technology selected for the data communications system will resolve the interoperability challenge in public safety. This is simply not accurate. The transport layer implemented through any communications infrastructure is only one of several elements impinging on operational collaboration between disparate agencies. The more significant challenge for interoperability is normalization at the application layer and particularly, cohesion between information technology infrastructures. The Commission's tentative conclusion wrongly assumes that the majority of agencies are similar in their technology requirements and their capacity to spend. This also is simply not accurate and penalizes the vast majority of public safety agencies that are small and medium sized by constraining them to adopt solutions more appropriately designed for a very large and densely concentrated user. Rather than imposing a single transport layer solution nationwide, and not really solving the interoperability issues, consideration should be given to the adoption of a standards-based approach for the transport layer (as has been under consideration the 700 MHz wideband spectrum) and provide the

flexibility to the individual user agencies to tailor their solutions and spending priorities in strict accordance with their specific operational profile and needs.

#### **E. Comparison Chart**

The following chart highlights some of the comparison points discussed above.

	<b>Broadband</b>	<b>Wideband</b>
<i>Available channel for nationwide use given 24 MHz of spectrum</i>	<ul style="list-style-type: none"> <li>• 20 channels</li> <li>• Inefficient use of spectrum; not enough channels for interference avoidance of adjacent locations</li> </ul>	<ul style="list-style-type: none"> <li>• 160 channels</li> <li>• More channels available to avoid interference issues</li> </ul>
<i>Guard band requirements</i>	<ul style="list-style-type: none"> <li>• 1 MHz from NB channels, 775 kHz from adjacent BB channels</li> <li>• Waste of spectrum</li> </ul>	<ul style="list-style-type: none"> <li>• 125 kHz from NB channels; 125 kHz from adjacent WB channels</li> <li>• Provides additional 5 wideband channels for use</li> </ul>
<i>Intermodulation interference</i>	<ul style="list-style-type: none"> <li>• Covers all voice channels, mixing with NB signals shown to be a problem in 800 MHz band</li> </ul>	<ul style="list-style-type: none"> <li>• Covers small subset of voice channels</li> </ul>

#### **F. Support of NPSTC for Wideband**

L-3 directs the Commission's attention to the support for wideband evidenced by a recent *ex parte* filing in this docket by the National Public Safety Telecommunications Council ("NPSTC") on April 17, 2007. The NPSTC made the following statements (among others) with which L-3 agrees:

Wideband data systems will be a necessary option, especially in the absence of a fully-funded national broadband network.

Restructuring the 700 Mhz band must accommodate and not strand the financial commitments to deploy infrastructure and equipment on the voice and data channels in reliance of Commission's rules.

The Commission should comprehend the value in providing public safety additional channels, the flexibility wideband affords local agencies and how technologies across all services can be promoted in the 700 MHz band.

## **II. Public Safety and Commercial Enterprise Sharing of the Same 700 MHz Band Spectrum Is Unwise and Beyond Commission Authority**

The Commission seeks comment on Frontline’s proposed “Public Safety Broadband Deployment Plan, its likely effects on both the commercial and public safety users in the 700 MHz Band, and whether it would be in the public interest to adopt such a proposal . . . .” *FNPRM* at P 277. L-3 submits that this idea should be rejected.

### **A. Questionable Legal Authority**

L-3 has significant concerns about the authority of the Commission to provide public safety spectrum for commercial uses. The current 12 MHz in the 700 MHz public safety segment does not provide enough bandwidth to support both the public and private users. L-3 believes the Commission should guarantee full control of the 24 MHz allocation by the public safety sector, and any development of new technology must meet all existing safety and security requirements for public safety radio systems.

The statutes require that the Commission allocate 24 MHz of spectrum between 746 MHz and 806 MHz to “public safety services.” 47 U.S.C. § 337(a)(1). The term “public safety services” is defined, in part, to exclude services “that are made commercially available to the public by the provider.” 47 U.S.C. § 337(f)(1)(C). It seems self-evident that spectrum licensed for public safety purposes cannot be used commercially. Yet that is precisely what the Frontline proposal would accomplish.

The Commission would invite years of litigation if it went down this path. It should not attempt to enhance public safety readiness for future disasters with the same spectrum through which it would also be aiming to pump up broadband competition through introduction of “third pipe.”

## **B. Conflicted Centralized Commercial Operator**

The Commission should not confuse public safety service requirements by injecting for-profit and cost-cutting requirements of a commercial enterprise. There are inherent conflicts between commercial goals and public safety goals. The Frontline proposal, which would put key development and operation decisions in the hands of a commercial operator, favors the wrong side in this conflict.

For example, special arrangements are required to provide continuous basic radio coverage under network failure situations, such as base station fallback operations. But the cost-cutting drive of a commercial operation, through methods either overt or subtle, would not likely support such redundancy.

Similarly, the security requirements and attendant cost profiles for public safety needs are different than for commercial needs. Public safety organizations do need high speed data communication capability to enable new applications including streaming video, real-time text messaging and e-mail, high resolution digital images and the ability to obtain location and status information of personnel and equipment in the field. This is a mission critical need, meaning in part that security technologies purposely developed for high demanding professional users, rather than commercial technologies, must be used. Such security features could include data encryption, authentication of subscriber units in the network, capability to disable stolen subscriber units, etc. The costs and capabilities for such requirements are likely to play second fiddle to the investment recovery needs of a commercial licensee.

Having a single entity to take responsibility for the management of a nationwide network may be unwise. A notable drawback would be the loss of decision power and prioritization flexibility currently afforded the individual public safety agencies operating today. If this management and operation challenge is compounded by a strategy involving a

public/private structure, then the criteria and priorities regarding network roll-out and timing will result in a decision process less focused on the primary public safety customer and more inclined to ensure investment recovery.

### **C. Frontline Plan Leaves Too Many Critical Questions Unanswered**

The strategy and implementation aspects of the Frontline proposal as presented are severely underdeveloped. The issues related to the selection of the single service provider, the appropriate technology, the investment plan, the roll-out prioritization plan and the mechanism for government oversight to ensure the network is responsive to the public safety sector, are all complex issues that require further review, planning and management by a government stakeholder that has not yet been identified. These implementation issues, coupled with the anticipated challenges regarding the legality of the FCC's proposition, will delay the availability of the intended ubiquitous service to the user community nationwide.

Similarly, will there be implemented a nationwide training and certification program specifically for public safety network operators that their sole or principle purpose is the protection of life, health and property? Would the licensee be required to utilize only certified employees for this job? The training required to handle network allocations during an emergency condition requires unique skills that commercial operators are not expected to have. This is important, as a commercial centralized operator implementing a commercial broadband technology would not be able to guarantee the independence of operations of each organization: law enforcement, public safety, fire, EMS, corrections, at state, local or national level. These agencies would be relying on a commercial operator to manage their virtual portion of network and decide the allocation of the network capacity.

## **Conclusion**

L-3 urges the Commission to rethink its tentative conclusion regarding the use of wideband in the 700 MHz public safety spectrum. Wideband can play an important role in meeting the secure mission-critical voice and data needs of first-responder and public service agencies in an efficient and effective manner without stranding costs, within the existing 2x6 MHz spectrum allocation, with ability to support multiple independent agencies autonomously, with excellent surge/incident capacity and operate in the absence of central infrastructure. No known or contemplated broadband technology can support these requirements. L-3 further urges the Commission to reject the Frontline proposal as an ill-advised, and possibly illegal mixing of public safety service with commercial enterprise.